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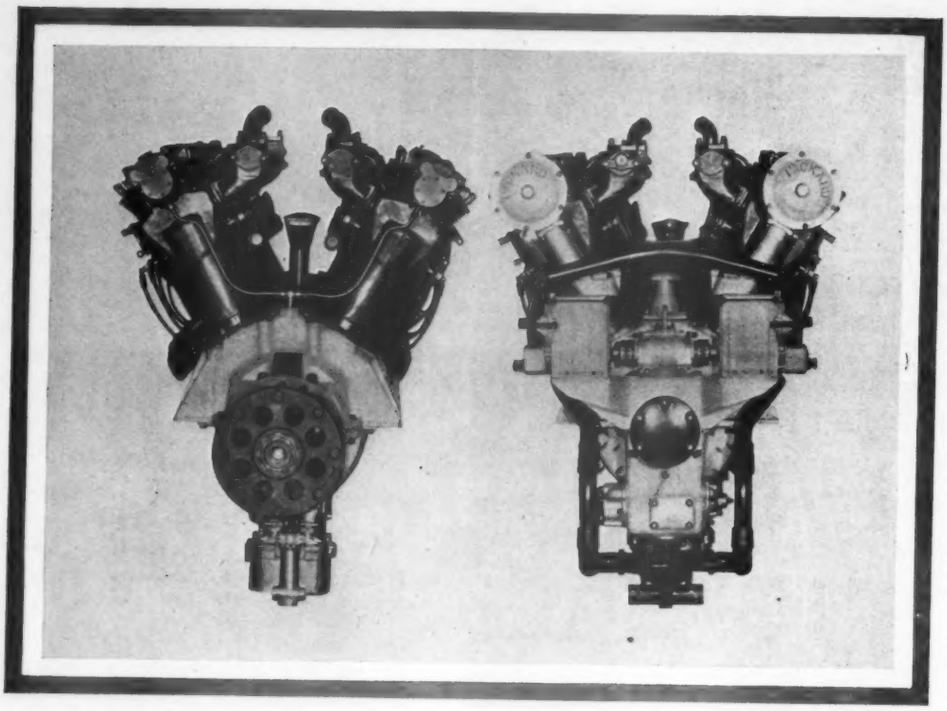

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AVIATION

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Hudson Airport

A CENTRALLY located airport which New Yorkers could reach by means of the existing rapid transit facilities has for years been considered one of the greatest necessities of civil aviation. The various flying fields situated in Long Island and New Jersey which have so far been used as the aerial terminals of New York all have the drawback of being too far from the center of the city and necessitating complicated transportation to the fields, with transfers from subway to railroad, thence to motorbus or street car, and from the latter to the field. The same situation obtained with regard to seaplane terminals, the stations at Flushing, Port Washington, being points in the case. The net result of this situation was that, it being nothing short of an expedition to reach a flying field in the neighborhood of the city, the average New Yorker went to an airport only on exceptional occasions, such as when a flying meet was announced. And even then inadequate or complicated means of transportation kept many thousands away.

The inauguration, by Aeromarine Airways, of Hudson Airport, at 79th Street off Riverside Drive, marks a happy change and an important improvement in New York's airport situation. The new airport is only three blocks from the nearest subway station, and offers beside a seaplane anchorage other necessary facilities such as sheltered waiting rooms, telephone, etc. Thus the incoming aerial passenger is enabled to reach his home or office in no more time than it would take him from a railroad terminal or a steamship pier.

Here, then, is an improvement which should make air transport appeal much more strongly to men in a hurry to get somewhere than has been the case before. Indeed, it seems futile to save say 50 per cent of the time of travel by using aircraft and then lose half of the gain by poor terminal facilities. This is particularly true with respect to comparatively short flights, for there loss in time at terminals often nullifies the whole advantage of the fast transportation provided by aircraft.

Hudson Airport has the further advantage of enabling the not-yet-flying public to see from the excellent vantage points afforded by Riverside Drive, the evolutions of flying boats engaged in a public service. By witnessing aircraft come and go, and take on and discharge passengers in the casual manner of steamships, the outlook of the man in the street is bound to be considerably modified. Aircraft will assume in his eyes the role of merely another means of fast conveyance, and once that notion becomes rooted, confidence in public air transport will follow as a natural consequence.

Now that seaplanes have obtained the logical terminal in New York City, there still remains the question of a centrally located airport for land machines.

Civil Aviation Statistics

CONSIDERABLE interest attaches to the statistics of civil aviation in the United States which the Aeronautical Chamber of Commerce recently submitted to the Department of Commerce. The report, which is reproduced in this issue, shows conclusively that aircraft engaged in commerce, when operated by responsible firms who know the value of safe flying and effective maintenance, suffer from a singularly small number of accidents. It also shows that the vast majority of accidents occur in connection with itinerant flying, that is exhibitions and joy riding furnished by enterprises which lack the means of insuring proper maintenance and also lack judgment as to what does and what does not constitute safe flying. Finally, it indicates that the lack of suitable airports, emergency fields, weather forecasts, markers, etc.—in short all that goes to make up that complex problem known as "ground organization"—is to be blamed for all accidents that are not to be imputed to lack of judgment.

We cannot help but wondering that, lacking federal air legislation there should have been so few accidents during the twelve months under review. That this should be so is perhaps due less to improvements in the airplanes themselves—most of those in use being converted war products—than to a growing realization on the part of aircraft operators that it pays in the long run not to take chances.

And taking chances does not merely mean sideslipping into a field a hundred yards square and bordered with trees. It also means going up without being *certain* that every wire, every turnbuckle, every nut and clevis pin, in brief everything, is in the right place and in the right condition. In this connection J. E. Whitbeck, Superintendent of the Air Mail Service, told an instructive story at the last Aeronautic Executives' Luncheon. Some time ago the Air Mail instituted a rigid inspection system to which every one of their ships was subjected before every flight. After a certain time the pilots began to complain that this system was merely red tape and that it did not have any practical value. To convince the fliers of the contrary, Mr. Whitbeck agreed to call off the "system" for a week, so the results would speak for themselves. The result was that whereas there had been no forced landing for months while the inspection system was in operation, the week of operation without the system produced four forced landings. The lesson was so obvious that there was no more complaining about the inspection service, which was reinstituted.

The record of safety and reliability established by the Air Mail during the past year, with no fatal accidents in operation and 93 per cent of the scheduled flights completed, affords by the way the best vindication of careful maintenance.

Inauguration of Hudson Airport

Brilliant Demonstration of Public Air Transport Furnished by Flying Boats of Aeromarine Airways

Hudson Airport, a sheltered seaplane anchorage situated on the Hudson at the foot of 79th Street, New York, and belonging to the city, was inaugurated on the afternoon of May 14 by Aeromarine Airways, who are going to use this station as the terminal of their various services radiating out of the city.

On the occasion of the inauguration the company entertained a large number of guests on board the steam yacht Wadena which is tied up to the 79th Street pier and acts as a mothership to the "Black Tail" airliners and flying boats. The yacht is fitted with an attractive and comfortable cabin, which will serve as a ladies' rest room, while additional quarters are available for men, so passengers intending to embark, and their relatives and friends, will find shelter, with telephone service. The equipment of the airport also includes the tender Service, an ex-submarine chaser of 19 knots speed, which will be used to rush supplies, spare parts, etc. for all emergencies. Several fast motor launches, for service between airliners and the mothership, complete the equipment of the Aeromarine installation. The telephone number of Hudson Airport is Schuyler 8017.

The Black Tail fleet turned out in strength for the inauguration, there being present the twin-engined airliners Santa Maria (pilot George W. Cobb) and Mendoza (pilot C. J. Zimmermann), the six-seater flying boats Vanderbilt (pilot Ed Musick), Biltmore (pilot D. C. Richardson) and Ambassador, and an Aeromarine Model 50 three-seater flying boat fitted with the Aeromarine U6 150 hp. engine. With the exception of the latter ship, which was painted black all over, all the Aeromarine boats wore their characteristic coat of white paint with a black tail, which makes it so easy to identify them.

As befits the inauguration of an airport, the ceremonies consisted mainly in giving the guests a practical demonstration of safe and sane flying by inviting them to go up on a sightseeing tour down to the Battery and return. There was an eager crowd to avail itself of the opportunity and one by one airliners and flying boats went up carrying a full complement of passengers, each ship making several trips, so large was the attendance.

Among the guests of the Aeromarine Airways who flew during the exhibition were Victor D. Herbster, representing Admiral W. A. Moffett, Chief of Naval Aviation; Maj. A. N. Krogstad, United States Air Service, aide to General Bullard; Maj. D. B. Netherwood and Comdr. E. P. Mannix, with the following staff officers: Comdr. C. F. Joyce, Lieut. Comdr. C. R. Robinson, Lieut. Comdr. C. S. Keller, Lieut. H. S. Oster and Lieut. S. H. Dickson, representing Captain Vogelgesang, commandant of the district.

Also present were, Lieut. Comdr. Marzos Zar of the Argentine Naval Commission; Felipe Tabaoda, Cuban Consul General; Murray Hulbert, President of the Board of Aldermen; Dock Commissioner J. H. Delaney; Mr. and Mrs. T. J. Oakley Rhinelander; Miss A. Hoffman, Miss Emily Chauncey, Mrs. L. J. Driggs, Mme. Marguerite Sylvia and Francis H. Marcoe.

The largest passenger list carried by any of the ships was that of the airliner Mendoza, which carried twenty-seven passengers, mostly high school girls, from the Aeromarine station at Keyport, N. J., to Hudson Airport. Inglis M. Uppercu, president of the Aeromarine Plane and Motor Corp., was also among the passengers. Altogether 147 passengers were taken up.

The reception committee on board the yacht Wadena was composed of Inglis M. Uppercu, owner; Charles F. Redden, president; L. B. Smith, general manager; Harry Bruno, advertising manager; F. Rodiguez, Cuban manager; and Earl D. Osborn, assistant treasurer of Aeromarine Airways.

The arrangements provided for handling the attendance were in every way excellent and there was not the slightest incident to mar the success of the inauguration. The passengers were swiftly and smoothly taken off the Wadena by a motor launch and transferred on board the flying boats they were assigned to. The handling of the ships, both afloat and in the air, was likewise first class and gave the uninitiated a glimpse of the silent efficiency to which Aeromarine Airways owe the splendid record of safety they have established in the history of American civil aviation. The drag of a strong ebb tide made the handling of the ships on water a delicate operation, which required all the skill of the personnel engaged. A word should also be said in commendation of the Aeromarine mechanics owing to whose conscientious work there was no engine trouble or any reluctance on the part of the engines to start on the first swing of the starting handle. Points of detail such as these prove best the high *esprit de corps* existing in the organization.

Some Facts Regarding the Air Mail Service

Some interesting and not generally known facts regarding the Air Mail Service were disclosed at the last Aeronautic Executives' Luncheon, held May 12, at the Cafe Boulevard, by J. E. Whitbeck, superintendent of the Air Mail Service.

Mr. Whitbeck, who was introduced to those attending the luncheon by R. R. Blythe, organizer of these highly successful reunions, stated that the safety and reliability of the Air Mail Service was showing a constant improvement, and that the operating costs were also decreasing at a slow but steady rate. To illustrate the former, Mr. Whitbeck said that during the last twelve months the total damage suffered by the planes amounted to only $2,000. This gratifying result was chiefly obtained by creating a rigid inspection system whereby mechanical troubles have to all practical intents been eliminated. On certain sections of the transcontinental service there has not been a single defaulted flight for many months and during the last year 93 per cent of all scheduled flights was completed. Of those defaulted 5 per cent were due to weather unfit for flying, while only 1½ per cent were caused by mechanical troubles, the residue being accounted for by miscellaneous causes.

That the Air Mail Service is now looked upon by pilots as a steady job is best shown by the fact that there has been no change in the flying personnel during the past year. The pilots fly on the average four days per week and are paid a minimum "base pay" of $2,000 a year, plus a flying pay in proportion to their flight mileage. The flying pay varies from 5 cents to 7 cents per mile according to the geographical nature of the route.

As an index to the earnings which are possible from commercial aviation line operated on a careful and business like basis, Mr. Whitbeck gave the operating expenses and possible revenue of the New York Chicago service during last March. His figures indicated that had the Post Office Dept. received a surcharge of 2 cents on each letter transported over that division during March the earnings would have been approximately $10,000 for the month, figuring all costs, including overhead, depreciation, interest on capital investment, etc.

Organization Plans of the N.A.A.

Admiral Fullam is Touring Country Organizing Districts of National Aeronautic Association

The plans for the organization of the National Aeronautic Association in Detroit during the race week in the fall are progressing rapidly.

Rear Admiral W. F. Fullam, U.S.N., (retired), is making a tour of the United States giving lectures, showing the wonderful strides aeronauties has made and organizing the districts and states on behalf of the new association. His route is outlined as follows:

1. Atlanta, May 7; 2. Birmingham, May 10; 3. New Orleans, May 12; 4. Houston, May 14; 5. San Antonio, May 17; 6. Los Angeles, May 20; 7. San Francisco, May 24; 8. Portland, Ore., June 2; 9. Seattle, June 3; 10. Spokane, June 5; 11. Minneapolis, June 9; 12. Chicago, June 11.

Admiral Fullam is attempting to have every city organize an Air Board, which would consist of representatives from each society or organization interested in aviation. Chicago has had an Air Board for some time now and it has proved an excellent organization for getting results. Admiral Fullam attended the Sioux City, Iowa Convention last March and is in an excellent position to direct the other districts in their organization work.

The organizers of the N.A.A. are agreed "not to let other countries get ahead of this nation in the air. They say that the world powers are today so financially embarrassed that they cannot support huge standing armies and navies, and that the next emergency will be marked with a great offensive in the air each side aiming to strike so suddenly and so quickly, that the other will be unable to mobilize its civilian army and navy reserves.

But not only for national defense do they forsee the power of the airplanes. Realizing the all-importance of speedy transportation in any community or state, they are aiming to build up new industries relying on the speed of the airplane and requiring this new medium of inter-communication.

Although the airplane was invented in the United States, there is no directing thought in the country. Here and there are found sporadic efforts on the part of local clubs and societies to develop this power but many are working at cross purposes. The time is now ripe for an association that all will join and with a united front for the furtherance of air power in the United States. The sponsors of this movement say that this body must be entirely independent and they are giving a great deal of thought and hard work to insuring a democratic, non-partisan, representative association that will not reflect the wishes of any particular community but speak in the behalf of the nation as a whole, so that the necessary legislation, the necessary airways, routes and landing fields, can within as short a time as possible be brought into existence. With these well established air routes planned and with the over-head taken care of as it should be, air lines will be a certain success and flying will become every-day and commonplace, safe and regular.

Civil Aviation in the United States

Aeronautical Chamber of Commerce Memorandum On Twelve Months Operation of Civil Aircraft

Three deficiencies operate to the serious embarrassment of of American aviation—meager capital, insufficient terminal facilities and popular doubt as to reliability. The correction of these deficiencies, and the consequent opportunity for the rapid growth of aerial transport, depend upon federal regulation and reasonable control through an aerial code.

In a recent issue of *Commerce Monthly,* organ of the National Bank of Commerce of New York, it was declared: "Wise regulation may be expected to give a certain stabi'ity to the air transportation industry essential to any industry which must appeal for credit and for investment capital. Until this is attained air transportation can not be said to be on a business basis. From whatever point of view the subject is approached, the conclusion is inescapable that the enactment of air law is the first essential step toward the development of commercial aviation in the United States."

The experiences of the inland waterways and the railroads in either burdening themselves with huge terminal debts, or in struggling selfishly for the exclusive control of available sites, a control which meant private monoply and this, in turn, public burden, point the way for the sound economic treatment of the airport problem. The establishment of common terminals for the encouragement of all aviation, and for the national security in time of need, is a public responsibility, which, if neglected now, will invite difficulties within a few years similar to those in which the waterways and the railways now find themselves.

Increase in Number of Airports

At the close of 1920, operating reports showed the existence of 128 terminals of all classes, of which five were in Canada, and three others devoted to airship experiment, leaving a net of 120 in the United States. Of this number, probably twenty could be classified as seaplane bases.

At the close of 1921, the operating reports showed a total of 146 air terminals, both land and water, within the United States. All were for heavier-than-air craft. This is an increase of twenty-six over the preceding year. Of the total number thirty were classified as seaplane bases, and sixteen were publicly owned or controlled. The 146 terminals available to commercial aircraft represent the facilities for 600 machines without regard to geographical or business requirements. The wonder is that there has been so much paid flying from so few fields.

How Information is Obtained

In preparing the data for the Department of Commerce, the worst obstacle encountered in research and analysis was the lack of official machinery with which to obtain thorough and authentic information. Two courses were open—confidential data (as to identification) from the established companies making operating reports; and press stories, covering the general field. It is important to state at this point and to bear continually in mind that the press stories (with the exception of less than half a dozen fatalities) refer wholly to the gypsy flier and thus prove conclusively that the uncontrolled itinerant pilot encounters and causes most of the danger in flying.

One hundred twenty-five established companies, operating from 500 to 600 two and three-place machines, made 130,736 flights, covering 2,907,245 miles and carrying 122,512 passengers in the twelve months Oct. 1, 1920—Oct. 1, 1921. In making their reports, these companies seemed careful to

itemize all forced landings, crashes, etc. Yet the number of accidents in which persons were killed or injured, totals but twenty-four, involving 6 killed and 21 injured.

Six Requisites for Safe Flying

Experience has taught that, in safe flying, there are the following requisites:—

1—A machine sound, aerodynamically and structurally.

2—An engine of sufficient power and which operates satisfactorily.

3—A competent, conservative pilot and navigator.

4—Airports and emergency landing fields, sufficiently close together to insure gliding to safety.

5—Nation-wide weather forecasts specialized and adapted to the need of fliers.

6—Nation-wide chart of air routes.

Analyzing the causes to which the twenty-four accidents are attributed: Of the six fatalities three were due to stunting, two to gross carelessness on the field, and one to storm. Not a single person, passenger or pilot, lost his life in straight commercial flying. And with federal regulation, controlling stunting and enforcing proper field policing and protection, it is believed certain most of these fatalities would have been avoided.

There were twenty-one persons injured in the twenty-four accidents. These mishaps were due to causes which could have been removed by federal regulation or supervision—had landing fields, air routes and weather reports been fully available; had the field help been more disciplined; had the pilots been more alert through consciousness of licensed responsibility and had there been strict inspection of aircraft, engines, accessories and supplies.

The Case of the Gypsy Flier

It is estimated that during the calendar year 1921, 1200 aircraft were engaged in civil flying in the United States and that these flew 6,500,000 miles and carried 250,000 persons. These figures are approximate and include both the itinerant and fixed base flying. Many press reports may be inaccurate as to causes, but they afford the only available index into the comparative safety of the total aerial activity.

A survey of this itinerant flying shows that 114 accidents occurred, not including those that involved government-owned aircraft. Two of the 114 occurred in January, one in February, two in March, six in April, sixteen in May, thirteen in June, thirteen in July, twenty-eight in August, sixteen in September, eight in October, eight in November and one in December, progressing and diminishing as the flying season advanced and waned. The accidents were reported from all parts of the United States—thirty being in the East, forty-three in the Middle West (which has most of the machines, and generally speaking, the best natural landing fields) and forty-one in the Far West.

What Caused the Accidents

The 114 accidents resulted in death to forty-nine persons and injury, more or less serious, to eighty-nine. In forty-eight instances there were no casualties. The forty-nine lives were lost in thirty-three accidents and injury to the eighty-nine persons was caused in forty-two accidents.

Each of the 114 accidents recorded was caused by deficiency in one or more of the six necessary requisites for safe flying. Forty-nine were attributed to the pilot, perhaps through carelessness, perhaps incompetence, perhaps bad judgment combined with other factors. There is no doubt that a good pilot can guide a poor machine to safety with greater chance of success than a poor pilot can operate a first-class craft. Therefore, at the very top of the list of governmental needs we place the federal examination and licensing of pilots. During the war rather more than 17,000 young men were trained to fly. The capability of flying cannot be retained perpetually without practice, nor can it be maintained at a high degree of competency without regular examination on a common standard for all flying throughout the United States. The same is true of aerial navigators. Both pilot and navigator (many times they are identical) are of equal importance in safeguarding the lives of travelers by air.

Twenty accidents are attributed in whole or in part, to inadequate landing fields or to the total lack of terminal facilities. Here is a duty directly imposed upon the federal government. During the war the Army and the Navy acquired many terminals, most of which have since been abandoned. The fragmentary remainder has been slightly added to by the Air Mail, municipalities and private enterprise, but the United States is today woefully lacking in airports for even the 1200 craft in operation.

Lack of Weather Reports

While only four accidents are attributed to the lack of weather reports and ten to the lack of clearly defined routes or limitations in traveling between or over cities, it is certain that aerial transport can not develop until these factors are met. As an illustration—two of the worst accidents in our flying history are attributed to these causes. As one was naval and the other military, they can not be included in the civil survey, though in their results they were as harmful to civil flying prospects as though they had occurred to private individuals.

On March 2, a naval seaplane, according to press reports, sideslipped onto a beach near Pensacola, Fla., and killed five bathers. Either the seaplane had no business over that beach or the bathers had no business on it. In either event, the fatalities would have been prevented had proper authority existed.

On May 28 a large Army plane crashed at Morgantown, Md., killing its seven occupants, who included some of the best-known figures in military and civil aviation. According to the report of the Inspector General's investigators, the disaster was not due to defects in the machine nor to incompetence on the part of the pilot, but to the terrific storm into which the ship flew and of which the pilot had not been warned. The investigators above referred to recommended that "steps should be taken to install a system for interchange of weather conditions and weather forecasts, between flying fields maintained by the various services, including Army, Navy, Mail Service and Coast Guard Service." It was further stated: "Obtaining information of weather conditions on a cross-country flight ranks in importance with the inspection of the engine and plane, and it is highly desirable that, in peace times, except in emergencies, no cross-country flights should be undertaken until available information of conditions on the way has been obtained."

Commercial cross-country or inter-city flights, it is evident, cannot be encouraged with safety until there is full protection afforded by establishing civil weather reports and co-ordinating these with the various government reports. This service, obviously, cannot be provided by the several States.

Inspection an Imperative Need

Equal in importance with learning the qualifications of pilot and navigator is inspection of aircraft and engines. Out of the 114 accidents, twenty-two may be attributed to faults which proper inspection probably would have revealed—four concerning the plane, nine the engine and nine an accessory, gas or oil. This inspection should be made at frequent intervals by federal authority.

When it is remembered that operators of motor cars are required to qualify and that motor cars are periodically placed under rigid inspection, it is astonishing to learn that *anyone* can take *any* sort of flying machine into the air at the present time, with the consequent peril not only to himself and his passengers, but to many persons on the ground. If the standard of control were left to the various States, the hope of correcting this unfortunate condition would seem remote.

In one accident attributed to the attempt of the pilot to stunt an unsafe machine, two lives were lost. An investigator reported that the plane was not a factory-maintained product. He said: "It was one of the Army training types which had passed through many owners and which, my investigation shows, had been in at least four crashes previous to the final one. I found that the machine had been repaired by amateurs, that several of the spars and longerons were patched, some of them in four places. It was the giving away of these spars that undoubtedly caused the wings to collapse. The plane had

lain out of doors in the open field all winter and one windstorm had blown it the full length of the field—about 1000 yd.—and turned it over end. This spring it had been hauled back to its original position and put together again as best as might be. It was never inspected by a competent person, so far as I was able to learn. I found that the owner of the flying field—who is also a flier—had himself refused to fly this machine when the young man who took it up on its fatal trip was induced to become the pilot."

In the lack of any governmental examination and inspection, the legitimate manufacturers and operators have endeavored to do what they could. They check up on their products, but their control is of necessity limited to localities and to a comparatively brief period of time. As flying increases, this method must become more hopeless and a stern responsibility is thus placed upon the Federal Government to provide an adequate system of examination and inspection.

Stunting Causes More than 40 Per Cent of Deaths and Injuries

Twenty-nine of the 114 accidents occurred during stunting. In these twenty-nine accidents, twenty persons were killed and thirty-six injured—more than 40 per cent of the total. In other words, stunt flying in unrestricted areas was responsible for almost as many casualties as all other elements combined. Now stunt flying is necessary to testing and essential to warfare. It is believed advisable that all pilots know *how* to stunt so that, in case of an emergency, when *only* a stunt will save their craft, they will be able to act quickly, with understanding and without fear. But the habit of stunting for thrill is dangerous, fatal in many instances, and always harmful to civil flying. A governmental system of control, limiting stunting to certain areas will meet this unfortunate menace to aeronautics. In this connection, however, there is hope of general improvement. State Fairs and other amusements, since the war, have encouraged dare-devil flying as "concessions." But after stunts had killed many people and injured more under spectacular circumstances (such as collisions with grandstands, crashes on beaches, etc.) the New York State Fair Commission, according to press reports, eliminated the dare devil aerial acrobat from its list of attractions.

The danger of collision in the air is not great, providing levels of flight for aircraft under way are established and observed, and providing stunting is controlled. The two collisions reported occurred during stunt performances. In the first, one man was killed, and in the second, two were killed and one hurt.

Crowds Surge on to Field

Eight accidents causing injury to seven persons are reported through carelessness on the field. In several notable instances the pilot, in order to avoid the crowd which surged out in front of his machine as he was taking off or landing, deliberately wrecked his craft. It is observed that at every flying demonstration, even at locally policed fields, the spectators ignore warnings and must be forced to keep back. This is illustrated by the long list of automobile race track casualties, where spectators get in the way. Only federal rules rigidly enforced are able to meet this condition.

Searching for the "Unknown" Cause

Finally, eight accidents which caused death to four and injury to one, are attributed to "unknown" causes. The hope of preventing accidents depends on learning—then correcting—the cause of each. It is evident that federal authority is required to obtain information in such cases.

Flying Not Unsafe

From the foregoing it is seen that flying, even with the burden of unnecessary hazard, imposed through the lack of an aerial code, is not unsafe.

Eliminating those deaths caused by stunt flying (20) and those attributed to lack of fields, weather reports and clearly defined air lanes or routes (6) which only federal authority can correct—23 fatalities remain—or one to about every 12,000 passengers and one to 282,608 miles of travel—unlicensed, unregulated and uncontrolled, and carried on for the most part in former war machines built from three to four years ago.

In case of the 125 operating companies, which flew 2,907,245 miles and carried 122,512 passengers on 130,736 flights, not a single fatality occurred in straight commercial activity. And it is from this record rather than from the itinerant picture that the public should judge the safety of travel by air. These companies approximate the condition in equipment and personnel which will be general when the federal government recognizes its duty and responsbility.

Los Angeles Notes

Robert W. Powell, of Los Angeles, has been elected president of the Aero Club of Southern California to succeed W. Gillette Scott, whose health has impelled his resignation. Mr. Powell, who is connected with the Puente Oil Co., of Los Angeles, was a lieutenant in the Air Service and saw service overseas.

The Aero Club of Southern California now numbers in its active membership some of the most prominent residents of Southern California. It has been holding a series of open meetings planned to arouse public appreciation of aviation, and these have had a gratifying attendance. Glenn L. Martin and Bert Hall were among the speakers at these meetings.

Roy S. Gradle, of the 409th Pursuit Squadron (Reserve), has been re-elected president of the Commercial Aircraft Association of Southern California. The Association now has more than fifty airplanes represented on its membership roll, and has lighter-than-air representatives also. An active campaign is being carried on to promote adequate landing fields in Southern California cities. A new field has been opened at Santa Ana, Calif., about fifty miles southeast of Los Angeles by Chester L. Young, who maintains a commercial airplane there. It was dedicated by twenty members of the Commercial Aircraft Association, who flew to the field and were entertained at luncheon by the Santa Ana Chamber of Commerce.

The practical use of aero photography was strikingly illustrated in relation to city planning at Los Angeles recently when the Automobile Club of Southern California secured a series of aero photographic studies of the business section of Los Angeles as an aid in solving a serious traffic congestion problem. The photographs, which were taken by Ralph Like of the Pioneer Aerial Engineering Co., showed the automobiles on all streets in the central part of the city and also illustrated the movements of pedestrians. By this means the city planners were able to study actual conditions in a general view and to determine just where relief was possible.

Northwest Aeronautical Society

On April 19, a body of Seattle, Wn., men interested in aerial activities met and organized the Northwest Aeronautical Society for the purpose of furthering aeronautics in all its phases. The society intends to maintain a concentrated technical library and to disseminate information both technical and literary to enthusiasts and the general public.

It intends to hold classes, readings and lectures for the benefit of both beginners and advanced students of aeronautics. To relieve the monotony of study and serve as a practical demonstration of theories and designs advanced by members it is planned to hold a gliding and soaring meet during the latter part of the coming summer.

Worthwhile legislation favorable to aeronautics will be actively supported by the organization and assistance will be rendered the government in establishing an aerial defense for America.

The officers elected were: Orrin E. Ross, president; Walter Clayton, vice president; J. W. Miller, chief of technical staff; Arthur Sherman, secretary-treasurer.

Aeronautical Standardization

Standardization of Materials, Parts and Tools Desirable for Mass Production in Emergencies

(Concluded from last issue)

Next to materials the most effective standardization can be accomplished in the wiring of a plane, be it internal, external, interplane, or control wiring. Under this heading we shall not only consider the various types of wire, namely, hard wire, strand, and cable, but also streamline and round swaged wires. In addition consideration will be given to all that goes to make up a complete wiring unit, such as turnbuckles, shackes, ferrules, thimbles, and streamline wire and terminals.

Tinned Aircraft Wire—This is a solid, round, high strength steel wire used in internal construction and wherever flexibility is of no importance. The detailed specifications of the SAE for this wire should be standard practice. The diameter of this wire should be given in Browne and Sharpe gage. For standard use No. 14 (0.064 in.) B&SG, No 12 (0.081 in.) B&SG, No. 10 (0.102 in.) B&SG, and No. 8 (0.128 in.) B&SG, which have tensile strengths respectively of 800, 1300, 2000, and 3000 lb. are recommended. Ferrules for this wire are to be made of eight turns of the same gage wire as that on which they are to be used. This is in accordance with the recommendations of the International Aircraft Standards Board. The SAE standard ferrule consists of ten coils of wire of a diameter smaller by one gage size than that of the wire on which it is to be used.

Non-flex Aircraft Strand—This is a high strength 19 steel wire strand used in both external and internal wiring where flexibility is of minor importance. This strand is provided for by SAE specifications which are suitable for standard. The sizes selected for standard together with their corresponding tensile strengths in pounds, are as follows: 5/64 (780), 7/64 (1600), 1/8 (2100), 5/32 (3200), 3/16 (4600), 7/32 (6100), 1/4 (8000), 5/16 (12500), and 3/8 (17500). The larger sizes will hardly be necessary except for the large size planes, and for towing cables or hoisting slings.

Extra Flexible Aircraft Cable—This is a high strength 7 by 19 extra flexible steel wire cable used on aileron, elevator, and rudder controls, and wherever great flexibility is desired. The SAE specifications for this wire are satisfactory for standard use. Sizes to be generally used are 1/8, 5/32, and 3/16 with respective tensile strengths of 2000, 2800, and 4200 lb.

Flexible Aircraft Cable—This is a high strength 7 by 7 flexible steel wire cable suitable for engine controls and where only reasonable flexibility is required. The standard size for engine controls should be 1/16 diameter with a tensile strength of 485 lb.

There are also available SAE standards for reels to be used for shipping the above wires.

Turnbuckles—The use of the standard SAE turnbuckles is recommended as these turnbuckles have the same strength as that of the non flex strand selected. The gap, hole, and general clearances of these turnbuckles should furnish the basis for the design of the standard shackles, and the rigid and universal streamline ends as indicated in Table 2.

Shackles—Shackles should be designed of alloy steel, and made interchangable with the SAE turnbuckles. This means that for every turnbuckle there should be an equivalent shackle, having the same strength, gap, hole, and general clearances.

Thimbles—The use of SAE galvanized steel thimbles with the above sizes of wire for which they are designed is recommended.

Clevis Pins and Bolts—Cottered clevis pins should be used in all turnbuckles and shackles, in all instances with the exception of surface controls where the use of cottered bolts with castellated nuts is preferable.

Loops and Splices—All wire loops and splices should be made in accordance with the SAE standard for them.

Streamline and Swaged Wire—Unfortunately manufacturing conditions do not permit of the manufacture of streamline and swaged wire of exactly the same corresponding strength as that of non flex strand. However, as shown in Table 2 these strengths do approximate very closely those of

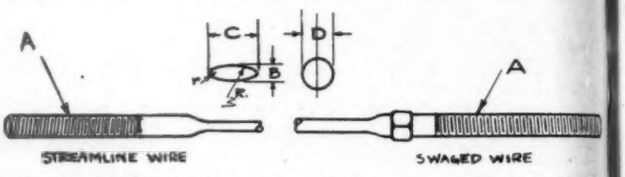


Fig. 1. Standard sizes of streamline and swaged wire (see Table 1)

TABLE 1

TENSILE STRENGTH (LB.)	STREAMLINE WIRE A U.S. FORM TH'D.	B	C	R	y	AREA	SWAGED WIRE D
1000	No. 6-40	.048	.192	.288	.011	.0071	.107
1900	No. 10-32	.064	.256	.384	.014	.0125	.140
2600	No. 12-28	.075	.300	.450	.016	.0173	.161
3400	1/4-28	.087	.348	.522	.019	.0234	.187
4600	5/16-24	.101	.404	.606	.022	.0313	.208
5700	5/16-24	.110	.440	.660	.024	.0376	.231
8500	3/8-24	.135	.540	.810	.030	.0563	.284
11500	7/16-20	.159	.636	.954	.035	.0781	.338
15500	1/2-20	.183	.732	1.098	.040	.1026	.391

TABLE 2

WIRE; STRAND, CABLE				TURNBUCKLES, SHACKLES & SWAGED WIRE			STREAMLINE & RIGID & UNIVERSAL TERMINALS.		
AIRCRAFT WIRE (TINNED) B&SG DIAM.	NON FLEX. STEEL 19 STRAND DIAM.	EXTRA FLEX STEEL 7x19 CABLE DIAM.	TENSILE STRENGTH (LB.)	SIZE O HOLE (INCHES)	GAP (INCHES)	TENSILE STRENGTH (LB.)	TENSILE STRENGTH (LB.)	SIZE OF HOLE (INCHES)	GAP (INCHES)	TENSILE STRENGTH (LB.)
	5/64(.078)		780	3/16	.109	800	1000	3/16	.109	1000
No. 14(.064)			800	3/16	.109	800	1000	3/16	.109	1000
No. 12(.081)			1300	3/16	.150	1600	1900	3/16	.150	1900
	7/64(.109)		1600	3/16	.150	1600	1900	3/16	.150	1900
No. 10(.102)			2000	3/16	.150	2100	1900	3/16	.150	1900
		1/8(.125)	2000	3/16	.150	2100	——	——	→	——
	1/8(.125)		2100	3/16	.150	2100	2600	3/16	.150	2600
		5/32(.156)	2800	1/4	.203	3200	——	——	——	——
No. 8(.128)			3000	1/4	.203	3200	3400	1/4	.203	3400
	5/32(.156)		3200	1/4	.203	3200	3400	1/4	.203	3400
		3/16(.188)	4200	5/16	.203	4600	——	——	——	——
	3/16(.188)		4600	5/16	.203	4600	4600	5/16	.203	4600
	7/32(.219)		6100	3/8	.203	6100	5700	3/8	.203	5700
	1/4(.250)		8000	3/8	.266	8000	8500	3/8	.266	8500
	5/16(.313)		12500	7/16	.344	12500	11500	7/16	.344	11500
	3/8(.375)		17500	1/2	.406	17500	15500	1/2	.406	15500

non flex strand. It is recommended that the detailed dimensions given in Table 1 be adopted as standard. These wires are to be made of standard alloy steel material. The use of these streamline and swaged wires wherever practicable on production models is urged.

Streamline and Swaged Wire End Terminals—For use with the standard streamline and swaged wires a series of terminals, both rigid and universal (Hartshorn Strap Type) should be developed. The thread of these terminals should correspond with that of the standard wires, and the size of hole and gap

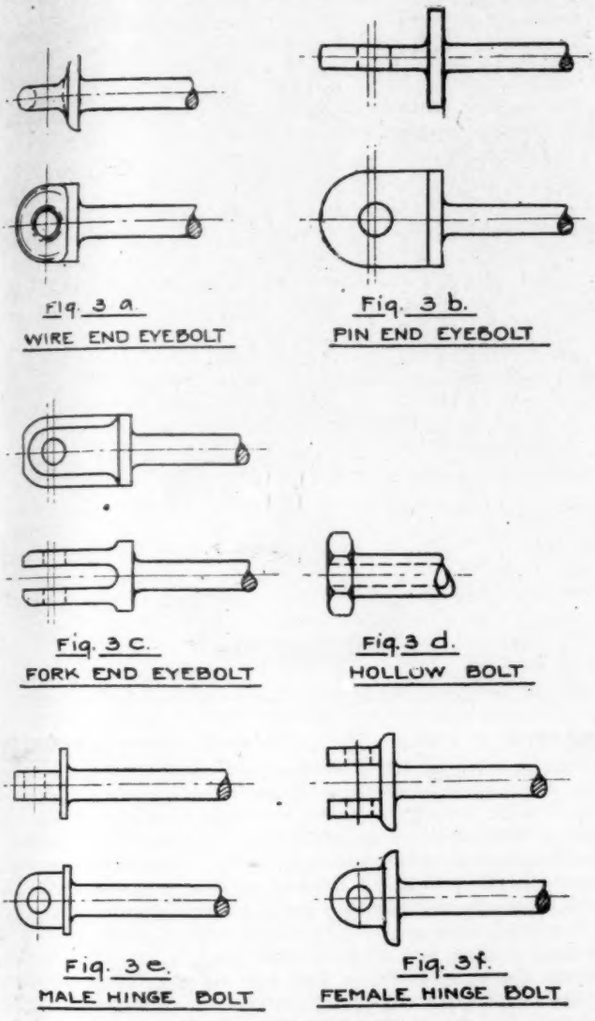


Fig. 2. Bolt standards

with that of standard SAE turnbuckles. In this way we will be assured of having terminal ends of the same strength as that of the wires with which they are used.

Table 2 is devised to show the tensile strength of the standards suggested and the relation that should exist between them. If they are used as suggested we will have the absolute interchangeability of parts which is so desirable.

Aircraft Hardware

Bolts and Nuts—In this field the SAE has already done some splendid work. They have standardized for aeronautical use plain hexagonal head bolts, ball hexagonal head bolts, plain hexagonal nuts, castellated hexagonal nuts, and ball hexagonal nuts. The use of their standard designs in these instances is recommended. All bolts should be made of the standard alloy steel, and all nuts of the carbon steel. For adoption as a standard set of sizes of plain hexagonal bolts it is recommended that No. 10-32, ¼ in.-28, 5/16 in.-24, ⅜ in.-24, 7/16 in.-20, and ½ in.-20 be considered with lengths varying by even eights of an inch. The use of bolts smaller than No. 10-32 is not recommended as they corrode too rapidly under service conditions in structural parts, and since they may well be replaced by brass machine screws when it is desired to merely hold objects, such as instruments, in place. With the present trend toward rectangular wing beams it is not deemed necessary to regard ball hexagonal bolts and nuts as standard parts. In the rare instances where they are required they may be made up according to the SAE standards.

Plain hexagonal nuts and castellated hexagonal nuts of the SAE standard type should be regarded as standard in the sizes required for the plain hexagonal bolts selected as standard.

In addition the following types of bolts may also be standardized for general use—Wire End Eyebolt (Fig. 3a), Pin End Eyebolt (Fig. 3b), Fork End Eyebolt (Fig. 3c), Hollow Bolt (Fig. 3d), Male Hinge Bolt (Fig. 3e), and Female Hinge Bolt (Fig. 3f).

Wire End Eyebolt—This type is for direct use with wires which are to be looped through it in accordance with standard practice. The use of this eyebolt affords an opportunity to make a direct wire connection to the bolt without the use of the additional wire lug which would be required with a plain hexagonal bolt.

Pin End Eyebolt—This is for direct use with the female end of standard turnbuckles and with shackles. Its use also eliminates the necessity of using a lug under a plain hexagonal bolt.

Fork End Eyebolt—This is for direct use with the male end of turnbuckles, strut sockets and similar parts.

All three types of eyebolts should be considered standard in the following sizes: No. 10-32, ¼ in.-28, 5/16 in.-24, ⅜ in.-24, and varying in lengths by eighths of an inch.

Hollow Bolt—Where a bolt is not used to develop tensile strength as much as it is for shear and bearing the use of a hollow bolt with its consequent saving in weight is recommended. The following sizes are recommended for standard:

Outside Diameter	Inside Diameter
3/8″ - 24	3/16″
1/2″ - 20	5/16″
5/8″ - 18	3/8 ″
3/4″ - 16	1/2 ″
7/8″ - 14	5/8 ″
1″ - 14	3/4 ″

With the hollow bolt a special thin type of cottered nut should be developed since the use of the standard SAE nut would give an excessively heavy nut designed to withstand the full tensile strength of a solid bolt.

Hinge Bolts—The male and female hinge bolts are designed to act as wing and tail surface hinges. Nos. 10-32 and ¼ in.-28 will be found satisfactory for most instances.

Clevis Pins—Clevis pins or flat head pins made of standard alloy steel should be used with all turnbuckles and shackles. The length of the clevis pin should be designated by its grip which is the length from the under side of the head to the near edge of the hole for the cotter pin. The hole for the cotter should be 3/32 in. from the end of the clevis pin. Standard diameters should be 3/16 in., ¼ in., 5/16 in., ⅜ in., 7/16 in, and ½ in., and with lengths to suit the grips of the standard turnbuckles, shackles and terminal ends

Cotter Pins—The use of commercial steel cotter pins is advised. The sizes ordinarily required are 1/16 in., 3/32 in., and ⅛ in. diameters with lengths to suit the standard bolts and nuts.

Flat Washers—For all standard bolts, clevis pins, machine screws and the like the adoption of a standard washer in steel and brass is advisable. It would also be well to have a group of standard extra size outside diameter washers for use in side bearing on wood. While these washers would not have universal use they would suffice in the vast majority of instances.

Lock Washers—The use of the SAE lock washer (light series) is recommended for general practice whenever a steel lock washer is required.

Bevel Washers—Bevel washers should be made of carbon steel with a diameter of hole for each standard size of bolt. The variation in angle may well be confined to the following: 6. 12, 24, and 36 deg. rather than to make them up to a precise angle in each case.

Commercial Hardware

The use of special hardware, which was hardly to be avoided during the World War when everything was hard to get, should not be tolerated in normal times. The greatest trouble in this respect lay in the fact that the aeronautical industry as a whole was not conversant enough with the industries whose hardware it adopted. Hence the aeronautical industry failed to specify its hardware in the commercial designation and size in which the same hardware was used in the original industry, so that we had nearly as many types of hardware as there were kinds of planes. This practice is particularly harmful when an experimental plane built from whatever screws, rivets, nails, etc., are most conveniently available is suddenly rushed into production. Then it is often found that the ill fated attempts to obtain quantities of the original hardware only result in vexatious delays until the entire hardware design has been revised to meet the available supply. The universal adoption of hardware standards would avoid this, and with this as an objective the following recommendations are offered:

Wood Screws—Brass wood screws should generally be used in preference to steel wood screws. Brass wood screws should be of two types—round head and flat head. The use of suitable lengths of numbers 2, 3, 4, 5, 6, 8, and 10 as standard is recommended. Steel wood screws wherever used should also be either flat or round head.

Machine Screws—Machine screws should be either of brass or steel, round or flat head. The use of the fine series of thread of the National Screw Thread Commission is recommended. Nos. 4-48, 6-40, 8-36, 10-32 are recommended for standard usage.

Brass Escutcheon Pins—These pins furnish a neat finish, and are useful in riveting very small parts. Escutcheon pins should be specified by diameter in BWG and length in inches. Nos. 18 (0.049 in.) BWG is a typical standard diameter to be used in lengths varying by eighths of an inch from 3/8 in. to 1 in.

Brass Flat Head Wire Nails—These are the most useful nails in wing construction and all similar forms. They should be specified by diameter in BWG and length in inches. The use of Nos. 20 (0.035 in.) and 18 (0.049 in.) is recommended.

Steel Wire Nails—Steel wire nails should be specified as 3 penny, 4 penny, etc. Commercial hardware catalogs give the equivalent diameter and length.

Steel Wire Brads—These are particularly useful in the pattern shop. They should be specified in BWG for diameter and length in inches. Nos. 18 (0.049 in.) and 16 (0.065 in.) are recommended for general use.

Copper Wire Nails—A very useful nail in hull framing, and one which can be used in riveting over copper burrs. This nail should be specified in the same manner as the steel wire nail. The use of 3, 5, 7, 9, and 12 penny nails is recommended.

Brass Hold Tight Clinch Nails—These nails find their chief use in fastening planking on hulls and floats. They should be specified by diameter in BWG and length in inches. Nos. 18 (0.049 in.) and 16 (0.065 in.) are recommended diameters for standard use.

Copper Tacks—When required copper tacks should be specified by weight in ounces. 3,6 and 10 oz. sizes will be required for general use.

Iron Rivets—These should be of three forms—flat head, countersunk head, and round head. Diameter and length both given in fractions of an inch are used as designations. 1/8 in. and 3/16 in. are best for standard use.

Copper Tinners Rivets—These are metallic tinned and are used for tank construction other than aluminum. They should be specified by size in ounces and pounds. 8 oz., 12 oz., 1 lb., 2 lb., 4 lb., and 8 lb. would provide an ample range of sizes.

Copper eyelets—Copper rivet eyelets may often be used to great advantage in fastening various thin sections of wood together, and in placing stiffeners on veneer sections These eyelets are specified lengths of copper tubing with a head spun in one end. No. 24 (0.022 in.)BWG will be found a satisfactory thickness with an outside diameter of approximately 3/16 in.

Miscellaneous—All such parts as grommets, lacing hooks, snap fasteners, small eyelets, and many others too numerous to mention can be bought commercially in a range of size suitable for aircraft needs. The following table is appended as a summary of standard designations of commercial hardware:

DESCRIPTION	MATERIAL	SIZE BWG	Penny	Inches	Ounces	LENGTH Inches
Brad, Wire	Steel	X				X
Nail, Wire	Steel		X			
Nail, Wire	Copper		X			
Nail, Wire (flat head)	Brass	X				X
Nail, Hold Fast Clinch	Brass	X				X
Pin, Escutcheon	Brass	X				X
Rivet	Alum.			X		X
Rivet	Copper	X				X
Rivet, Flat Head Tinners	Copper				X	
Rivet	Iron			X		X
Tack	Copper				X	

Pulleys

For surface controls the use of a molded bakelite micarta pulley with a graphite impregnated core is to be preferred to any of the metal pulleys. These pulleys are used with a tubular spacer placed on the core through which the bolt or clevis pin on which it revolves is inserted. These bakelite pulleys may be obtained commercially in 3/32 in. groove with overall diameter of 1½ in and 2 in., and in 7/32 in. groove with an overall diameter of 2 in., 2½ in., 3 in., and 3½ in.

Official Photo, U. S. Navy

Beautiful silver model of the Curtiss-Navy racer, belonging to the Navy Department

For hand lever engine controls the use of brass pulleys is advisable. The size most suitable is 3/32 in. groove with overall diameter of 2½ in. and 3 in. For radiator shutters, bomb releases and for kindred purposes a small brass pulley not exceeding 1¼ in. in diameter will be found useful.

Tools, Jigs and Fixtures

The design of tools, jigs and fixtures is a field in which we can hardly hope for general standardization, but one in which each manufacturer can do at least a considerable amount of work within his own organization.

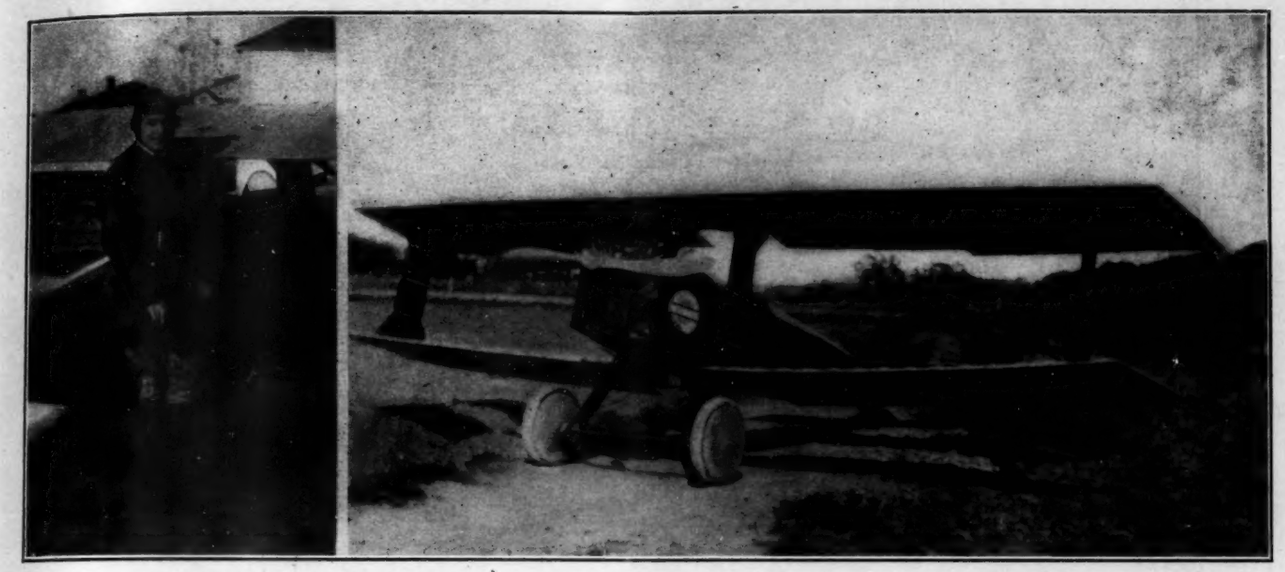
All taps and dies should be in accordance with SAE standards. Bolt holes should generally be drilled 1/64 in. larger in diameter than the bolt.

Further to illustrate the possibilities let us consider the matter of clips for fastening ignition wire, other electric wiring, tubes, and other similar parts to wood framing. For each diameter of wire or tube we can establish a definite width of clip and a corresponding radius and screw hole on the end. The width of the clip may vary by eighths of an inch. Parting dies may then be made to conform to these established sizes and thus facilitate the making of these or similar parts as required.

Flanged holes for baffles and for lightening can be limited to certain diameters, and the tools made standard. Rolls for putting a head on the end of tubes for hose connections, heading on tanks, and corrugations on the ends of tanks may be similarly standardized.

The Irwin "Meteorplane"

Small Single-Seater of Interesting Design Is Fitted with a 15 hp. Air-Cooled Engine



The Irwin "Meteorplane" and J. Fulton Irwin, its constructor. The clean-cut lines of the little ship which flies with 15 hp. only, are noteworthy

The Irwin Aircraft Co. of Sacramento, Calif., recently put on the market a small sport machine called "Meteorplane" Model MT, which embodies several interesting features.

The Model MT is a single-seater tractor biplane, and was designed to meet the demand for a small light weight airplane of conventional design that the average aero enthusiast could afford to have and operate.

This little plane has a quick get-away, good climb and a fair high speed, and—at the same time—a very low landing speed, such as insures the greatest degree of safety. Consistent with these qualities, the design and construction embrace very light weight, yet the factor of safety at any point of the whole machine is more than 5. The power loading is 26 lb., while the wing loading is only a little over 3½ lb/sq. ft.

Main Planes—Spars are of spruce and are hollow. Struts between planes are of streamline section and are built up of 3-ply wood and are I-shaped, thus doing away with all incidence wires. Another feature is that the planes slide along the body, thus making it an easy matter to get the machine in perfect balance. The rib webs are of yellow pine and the cap strips are of spruce. The Irwin No. 4 aerofoil is used. The dynamical stability of the planes is almost the same as the Eiffel 32.

Fuselage—The fuselage is of good streamline form with ash longerons. Its wooden frame is of box-girder construction, and four 3-ply wood panels hold the body in shape, while the whole body is braced by wires from the engine panel to the rudder post. The nose is covered with sheet metal and the remainder is covered with cloth, doped and varnished.

Undercarriage—This is of novel, yet simple construction and consists of two wide spruce members that form an A, which is held to the body at three points. This A is slotted at the ends to receive the rubber sprung axle which carries two 20 x 3 in. rubber tired wire wheels.

Tail Group—The empennage is composed of a non-lifting horizontal stabilizer, to which the horizontal rudders are fastened. The vertical rudder is of sufficient area to insure complete control in handling the machine on the ground.

Controls—Lateral and longitudinal balance is operated by stick control. The rudder is operated by the foot bar. Lateral control is obtained by two ailerons in the top plane and their effect is immediate in answering to the slightest movement of the stick.

Engine Group—An air-cooled 2-cylinder engine of 15 hp. drives a 4 ft. 11 in. propeller of 3 ft. pitch at 1900 r.p.m.

Specifications

GENERAL DIMENSIONS

Span—upper plane (57 sq. ft.)	19 ft. 10 in.
Span—lower plane (48 sq. ft)	19 ft. 1 in.
Overall height of machine	5 ft. 10½ in.
Overall length of machine	13 ft. 9 in.
Depth of wing chord	37 in.
Gap between wings	38¾ in to 34 in.
Angle of incidence of upper and lower planes	2 deg. 30 min.
Dihedral angle (lower planes only)	3 deg.
Wing curve	Irwin No. 4
Number of ailerons (on upper planes only)	2
Stabilizer	9 sq. ft.
Fin	1½ sq. ft.
Vertical rudder	5 sq. ft.
Horizontal rudders	8 sq. ft.

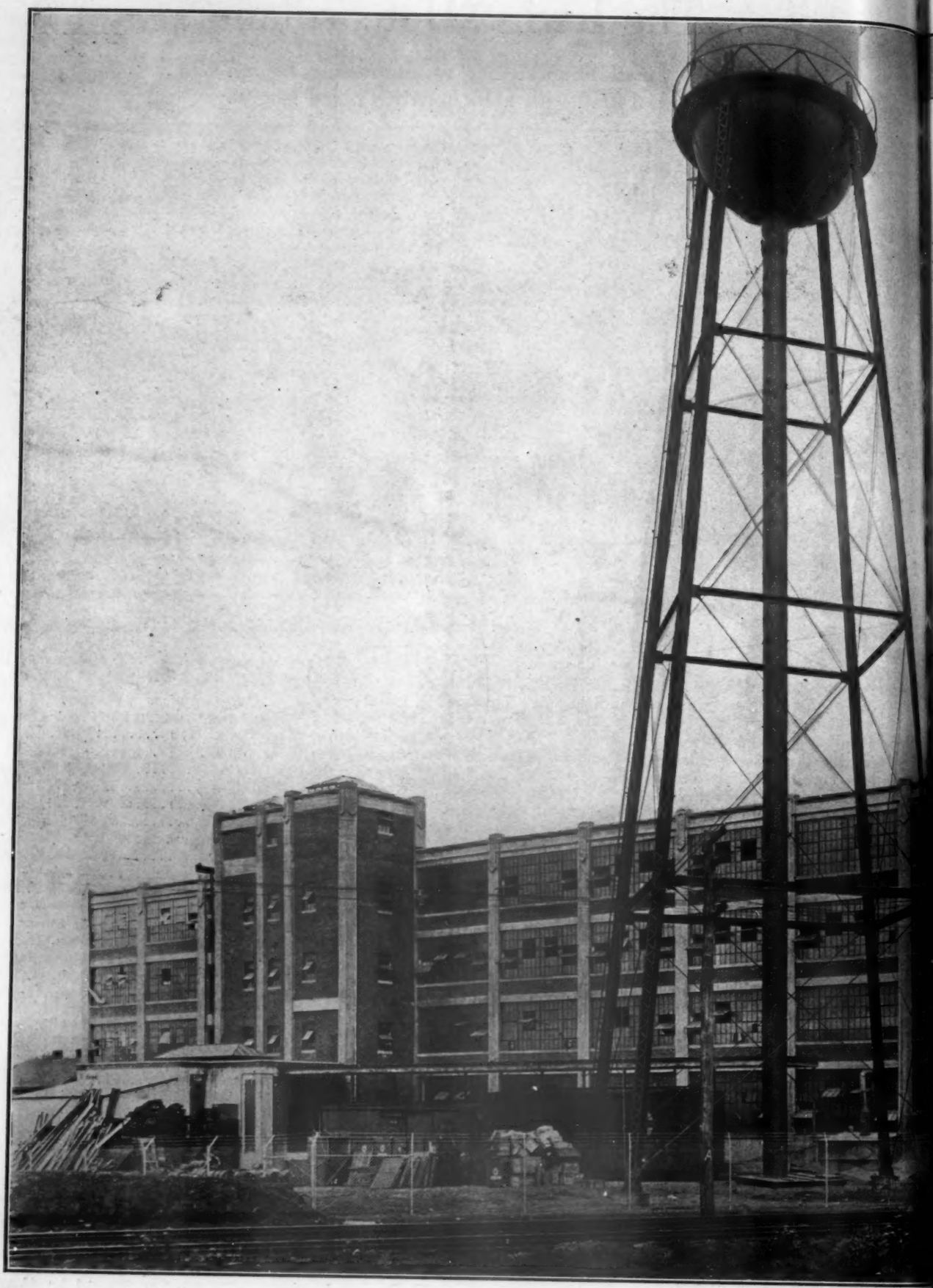
WEIGHTS

Net weight machine empty	240 lb.
Weight of fuel	16 lb.
Weight of pilot	140 lb.
Lift loading per sq. ft.	3¾ lb.
Gross weight machine loaded	396 lb.
Power loading per hp. (with 15 hp. motor)	26 lb.

PERFORMANCE

Maximum speed	56 m.p.h.
Minimum speed	32 m.p.h.
Rate of climb first minute	300 ft.
Climbs in 15 min.	2,500 ft.
Unsticks in	160 ft.
Lands in	110 ft.
Gliding angle	1 in 7
Range of action	1 hr. 45 min.

The Meteorplane is sold either complete with engine, or without engine, or in knock-down condition. Complete sets of blueprints for the construction of the machine are also sold.



WHERE WRIGHT AERONAUTICAL ENGINES ARE MADE

ACREAGE. Approximately 7 acres, located on Main Line of Erie Railroad.

AREA. 90,000 square feet.

DESCRIPTION. Four floors, size 75 ft. by 300 ft. Concrete and steel heavy mill type construction, 250 pounds per square foot loading.

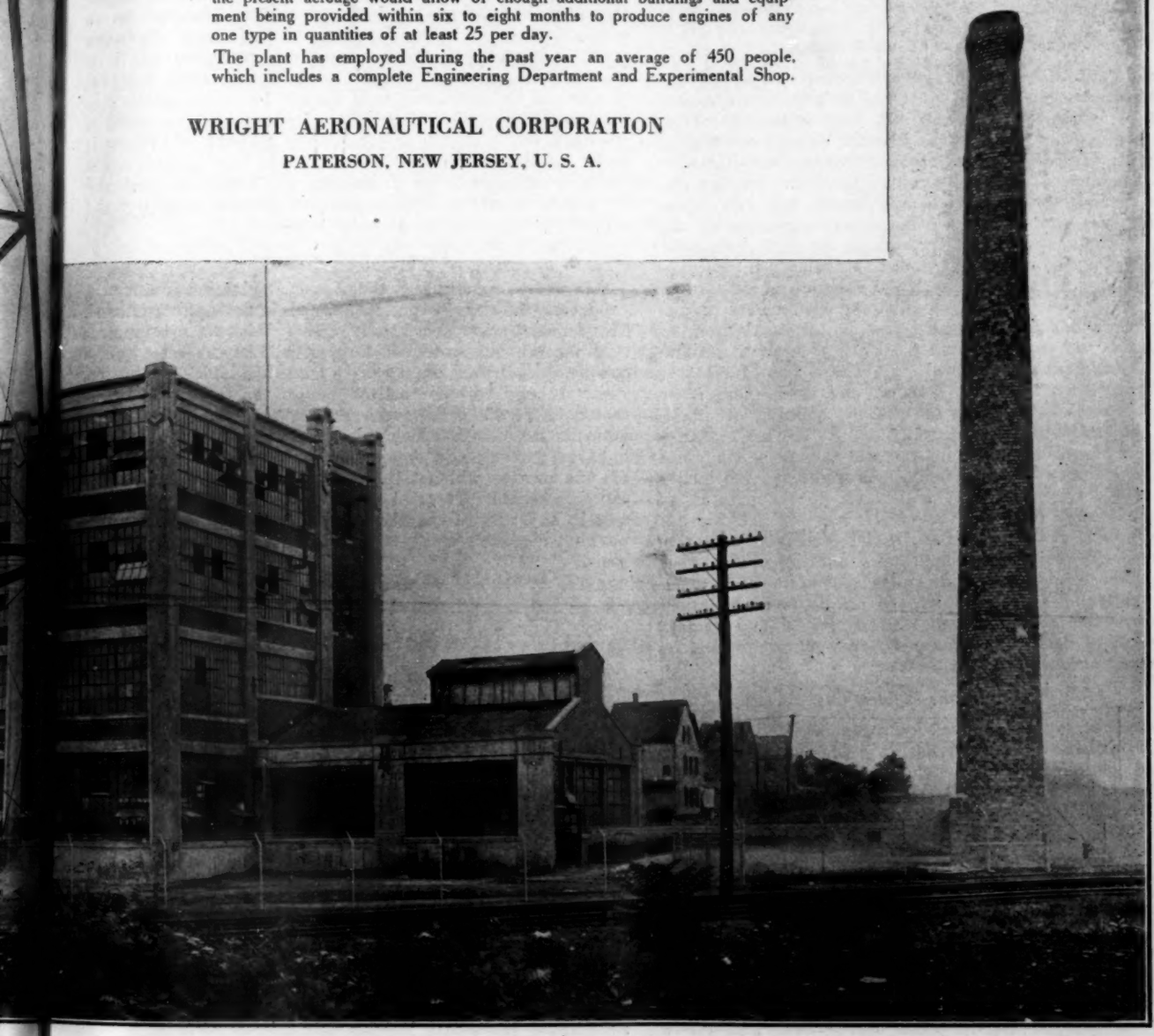
EQUIPMENT. The plant is equipped at present to produce, and is producing, approximately 300 engines per year, with spare parts therefore, and has ample capacity in addition to provide adequately for all spare part requirements for all types of engines previously produced. The equipment of the plant provides for the complete manufacture of various type engines produced, including bronze and aluminum castings, except bar steel and drop forgings.

The capacity of the present plant could be expanded to produce engines at the rate of five per day in the present building. In an emergency the present acreage would allow of enough additional buildings and equipment being provided within six to eight months to produce engines of any one type in quantities of at least 25 per day.

The plant has employed during the past year an average of 450 people, which includes a complete Engineering Department and Experimental Shop.

WRIGHT AERONAUTICAL CORPORATION

PATERSON, NEW JERSEY, U. S. A.



Origin and Possibilities of "Currenium"

Invention Based on Change in Atomic Valency -- Formula Still a Secret -- Production Predicted

Dr. Edward Curran of Los Angeles, who has developed the new gas called "Currenium," has prepared for AVIATION *the following statement regarding it.* EDITOR.

"This gas has been developed through a number of years of research made in the hope of producing a levitating gas for aircraft as good as, if not better than, hydrogen, but without its inflammable and explosive qualities, and which might be commercially efficient as well. I became first impressed with the possibilities of aeronautics at Chicago in 1893, and as I observed balloons the desirability of a safe and inexpensive gas seemed to be more and more important as an essential in effecting practical travel through the air. I studied over this a great deal, and my liking for chemistry and bacteriology probably led me to consider the problem more from the laboratory viewpoint than as a balloonist. At any rate, I began to reason the matter out and, as soon as I could, to make experiments.

Atomic Activity and Organic Changes

"These were interesting, but not profitable and not always exactly safe. I had several 'blow-ups' in getting acquainted with the qualities of hydrogen, but they strengthened my belief that a safer gas must be found. Finally, after some years of trying to get at elementals, I began to appreciate certain fundamental principles regarding atomic activity and organic changes. Atomic weight and specific heat are inverse concomitants—as one increases the other concomitantly decreases. We know, too, that through all material differentiations from a condition of utmost diffusion, or ultimate attentuation, with the least definity of matter and its motions to its greatest concentration, density and definiteness of motion, progressions which involve a state of gasefaction, of liquifaction, and even down to the state of greatest solidification of matter, accompanied, I believe, by increasing radiation of energy, both in amount and kind, there is an inexorable tendency to invest the greatest quantity of atomic matter, of the highest heterogeneity and of the least relative volumetric proportions, with the greatest amount of contained energy of paralleled heterogeneity. As we ascend the incline of organic developments, the higher we go the greater we find the demand for, and the greater are the quantitative absorption and redistribution of, radial forces of increasing heterogeneous wavelengths, amplitudes and intensities. All tend, as I have said, toward the endowment of the least quantity of matter of highest quality, universally and advolutionarily, with the greatest amount of contained and radiant energy having the least amount of heat-generating effect on surrounding and adjoining matter.

Is Hydrogen the Lightest Gas?

"We cannot say finally that hydrogen is the lightest gas, although we have said that it is the lightest and terrestially identified gas. When light from our chomosphere is spectroheliographically analyzed the existence of gases or elements lighter than hydrogen is revealed, while the spectroscopical analysis of light from some stellar formations yields similar, or even more decided, manifestations in this direction. This would indicate to us that elementary formations and their atomic weights—no two of which are the same—are varied to infinity and beyond the conception of our minds.

"In my investigations I found that the atomic valency may be varied, and also that the affinity of one given element for another given element may be increased or decreased or even totally destroyed. I found, too, that electricity is the primary cause of all material differentiations and that heat is the secondary cause; also that when such differentiations occur, as, and when the electrical and thermal conditions appertaining to matter conjoin, regardless of whether such conjunction may be naturally or artificially induced, at various stages of motion, phases of progression or states of heterogeneity, a transformation of the element is accomplished. This transformation may be said to be permanent until the contained electrical and remaining radial energy conjoin to induce other corresponding transformation.

"By a method developed from these research results I have been able to vary atomic valency and produce a gas which is load-lifting or levitating and which is without dangerous inflammable and explosive qualities of hydrogen. It is commercially producible, which is equally as important a consideration as to make it dependable. At present I am justified in asserting that this gas is fully as serviceable and as cheap as hydrogen, with added qualities of practical value, but I feel that the process by which I produce it may make even a lighter gas. It will be feasible so to vary atomic weights that a gas may be produced of even greater lift—how far we may ultimately go in this I hesitate to conjecture. Hydrogen may be harnessable under certain circumstances, and it is obtainable in unlimited quantities at an economical rate, but it will not be considered safe enough to secure public confidence. Helium is difficult to produce with commercial efficiency, and it cannot be produced in all parts of the world; under present production methods, there is a limited supply which is restricted to the United States. There is a great need for a gas as safe as helium, but with greater buoyancy and producible anywhere at a cheap rate.

Formula Still a Secret

" It will be readily seen that I cannot give the formula for producing this gas at present, for it is not fully protected. The demonstrations, chemically made, which have been made thus far are not as satisfactory as will be the case when a complete production plant can be made available—a situation, which I hope will be realized before the end of 1922. It should be possible, however, from what I have outlined, to note the manner in which this gas is produced. Machinery in large part already obtainable can be used in production, but the process will not be so expensive as that involved in securing helium. The materials required may be made available in any part of the world at an expensive rate. Electric power will be necessary for production on an economical basis."

New York Aerial Police

Through an arrangement concluded with the Navy Department, the aviation division of the New York Police Reserve is to receive complete training and equipment as a unit of the naval reserve force. Included in the equipment which the Navy is to turn over at once are four seaplanes and two hangars on the shore at Fort Hamilton.

With the addition of the four navy planes the flying equipment of the Police Reserve will consist of nine planes. The other five are land machines and are at the airdrome at Hasbrouck Heights, N. J. They are owned by officers of the reserve.

Inspector John F. Dwyer, retired, who is acting as aid to Special Deputy Police Commissioner Rodman Wanamaker, said that there were now 250 young men in the aviation division, at 156 Greenwich Street. They are being instructed in the ground-work of aviation preparatory to taking up air work at the Hasbrouck Heights field this summer.

Although the members of the aviation division are officially members of the naval reserve force, they will wear the police reserve uniforms and participate in various police activities.

Brief Review of Aeronautics in Italy

By Alighiero Baciocchi

Our Correspondent for Italy

In Italy the elementary problem of the civil aviation has not yet been solved. Hitherto no subsidy has been granted the air transport companies, but shortly a bill favorable to civil aviation is to be examined by the Chamber of Deputies.

The new War Minister, Prince of Scalea, is eager to help civil aviation, as appears from several of his statements.

Italian Air Transport Companies

The Italian air transport companies are as follows:

Compagnia di Navigazione Aerea, Ltd.
45 Via Aurora, Rome.
S.A.C.T.A., Ltd.
42 Via XX Settembre, Genova
Società Italiana Aviazone Civile Ltd.
38 Via Monte Napoleone, Milan.
S.A.I.A.M., Ltd.
2, via Carlo Alberto, Milan.
P. SORO, Ltd.
Cooperativa per la Navigazione Aerea
20, Via Barcellona, Cagliari
C.N.A.
Cooperativa Nazionale Aeronautica
39, Via della Scrofa, Rome.

The best organized company is the Compagnia di Navigazione Aerea on account of its capital and the wide experience of its board of directors. Another important company is the C.N.A. which is also one of the older air navigation companies. Its staff is composed of expert pilots and engineers of the last war.

Unfortunately, owing to the want of interest shown by the Italian government in the civil aviation, none of the above companies operate any line. Their activities are limited for the time being to aerial photography, joy-riding, aerial advertising, etc.

In the expectation of government's subsidies the Compania di Navigazione Aerea is carrying on a very interesting work, namely the study of many important requirements of civil aeronautics.

Status of the Air Services

Following is the present status of the government air services:

Army Air Service—This comprises twenty-five Squadrons, subdivided in three Groups: (a) Fighting Group, (b) Bombing Group, (c) Scouting Group.

The number of pilots is rather limited and very many of the machines are obsolete.

Naval Air Service—The Naval Air Service, too, has very many aircraft of old types. Of the 363 seaplanes which it possesses, only a very small percentage is composed of up-to-date machines, the other being surplus craft left over from the last war.

Colonial Aviation—Colonial Aviation is in a pitiable state. Save some machines in Benadir, the other Colonies are nearly without aircraft. In Libia specially the want of aircraft is felt very much to help the colonial services and for the interior inspection of that country.

The Aircraft Industry

On account of the aeronautical and general crisis the industrial situation is as below:

The Fiat Co. has declared that it will be obliged to shut down its aviation department for which it spends at the least It.£.250,000 per month.

The Ansaldo Co., after three years of waiting has just received an order for twelve machines of the A3004 type.

Caproni Bros. have received an order for two machines fitted with 450 hp. engines but they do not think it worth while to open the works again for such a small order.

The Breda Co. expects to receive orders. In the meantime it has converted a Caproni type Ca5 into a "Sarri-Limousine."

The Bastianelli Co. likewise expects to receive orders.

Only the Machi Co. and the Savoia Co. are at present suitably working, as they are doing business abroad.

Aeronautical Contests

The national events of this year will be very interesting and it is believed that they will surpass those of other countries. In addition to the events recently reported in AVIATION there will be in September on Lake Garda, a competition for the D'Annunzio Cup, while in Venice the Ancillotto Cup and the Grand Prize of Venice will be competed.

In Rome an important aeronautical meeting will take place in September on the occasion of the International Congress for the Aeronautics which this year will be held in Rome.

Flying School for the Air Service

The War Ministry has invited tenders for the instruction of the new soldiers of the Army Air Service. The company undertaking the School will be obliged to use for the instruction Aviatik, Gabardini, Hanriot and Nieuport airplanes.

New Type of Parachute

A new type of parachute (boat-parachute) constructed by the Stabilimento Costruzioni Aeronautiche di Stato (government aircraft factory) for use with kite balloons has been experimented lately. The tests were successful.

New Aerial Camera

In the Koristka Works of Milan a new type of camera for aerial and ground photography, which was invented by the Lieutenant Nistri, an Italian officer, is under construction.

This camera is precise, very simple and easily used. It affords the possibilty of surveying land and water only through its lens at sky climbing altitudes, that is to say without the help of the water and land work. Preliminary tests of an experimental camera were successful.

The camera is being built for the S.A.R.A., Ltd. (Società Anonima Rilievi Aerofotogrammetrici) 2, Via Silla, Rome.

Radio Experiments in Milan

An important Company of Wireless Telegraphy of this country, during the Sample Fair in Milan, will perform for propaganda some interesting experiments of transmission and reception between a district Aerodrome and some flying airplanes.

The Wireless Station will be established in a Stand of the Fair and another in an Airdrome of the District. Moreover, some messages will be transmitted by radiotelegraph between airplanes while in flight.

Balloon Race in Milan

Under the auspices of the Società Aeronautica Italiana of Milan and under the patronage of the Federazione Aeronautica Nazionale Italiana and the War Ministry, an international race for spherial balloons will take place in Milan on June 2 and 3, 1922. The prizes amount to It.£.30,000.

A few months ago a fire burnt out the interior of the Chapel of the Cathedral of Loreto, which is dedicated to the patroness of aviators. The work of restoration is nearly finished and the new image of the Virgin Mary, carved in cedar-wood in the likeness of the original one, will be taken into St. Peter's, where it will be blessed and crowned by the Pope, whence it will be carried back to Loreto by an airplane.

Kentucky Encourages Aviation

That the State of Kentucky is full cognizant of the important role slated for aviation in the economic and industrial life of the country is manifested by the recent action of the State Legislature in passing a resolution requesting all towns and cities in the Blue Grass State to print in large letters the names of such respective towns and cities in such conspicuous place as may be observed by aviators passing over such towns and cities.

Capt. Harry B. Flounders, AS, stationed at Camp Knox, Ky., is directly responsible for the introduction and passage of this resolution. This officer is also endeavoring to work up interest in aviation in the other states of the Fifth Corps Area, in order to have a similar resolution passed. Officers stationed at Godman Field, Camp Knox, Ky., are giving lectures at various localities throughout Kentucky, and the State is taking a very active interest in the development of aviation.

The resolution, as passed by the Commonwealth of Kentucky, is as follows:

"*Whereas* much interest is being taken in the subject of aviation, especially in the subject of carrying the mails by such method, and,

Whereas aviators experience much difficulty in ascertaining the name of many towns and cities over which they are flying; and,

Whereas there are but few natural objects near the many towns and cities in this Commonwealth whereby such aviators passing over the same can ascertain the names of such towns and cities; therefore,

Be it resolved by the General Assembly of the Commonwealth of Kentucky:

Section 1. That the mayors of all towns and cities in this Commonwealth are hereby requested to have painted in letters sufficiently large to be seen at a considerable distance, the name of their respective towns and cities upon the top of some building or eminence in order that aviators in passing over such towns and cities may be able to ascertain readily the name of such town or city.

Section 2. That the Clerks of the Senate and the House of Representatives of the General Assembly of Kentucky shall transmit certified copies of this resolution addressed to the mayor of each town and city in this Commonwealth."

Lift and Drag Effects on Wing-Tip Rake

N.A.C.A. Report No. 140

This report by A. F. Zahm, R. M. Bear, and G. C. Hill, of the National Advisory Committee for Aeronautics deals with a description and report of tests carried out at the Washington Navy Yard on models of the RAF6, Albatross, and Sloan aerofoils to determine the effectiveness of the conventional wingtip rake in improving aerofoil characteristics. Two degrees of rake were tested on each model; the trailing edge being always longer than the leading edge. The results are compared with the values computed by standard formulae in use at the time the tests were conducted.

A copy of Report No. 140 may be obtained upon request from the National Advisory Committee for Aeronautics.

Spain Wants Aircraft

The Aeronautical Chamber of Commerce is informed that the Minister of War in Spain has asked the Cabinet for an appropriation of the equivalent of $25,000,000. for the creation of an Air Service, to include 240 airplanes plus the necessary reserve and equipment.

Horaclio Alfaro, Fenwick Club, Cincinnati, Ohio, in transmitting this information, states: "I have been in aviation business in my country for the past 12 years, and I am of course well acquainted with everybody interested in this line. Because of my continuous relationship and dealing that I have maintained with our Air Service, I think I am in a very good position for doing business with the Spanish Government."

Foreign News

Italy—A report giving the official record of the activities of the Civil Aerial Transportation Co., S.A.I.A.M. (Societa Anonima Imprese Aeree Milano) from its organization on June 1, 1920, to Nov. 30, 1921, shows that during this entire period a total of 4194 passengers were carried without accident, the actual flying time being 1309 hr. 40 min. Strange as it may seem, a comparison of the figures for 1920 and 1921 shows that there was a falling off in traffic during the latter year. During the period from June 1 to Nov. 30, 1920, the hours of flight totalled 777, and the number of passengers carried was 2316, while for the same period during 1921 the hours of flight totalled 311½, and the number of passengers carried was 903. As a matter of fact, the figures for the six months from June to November, 1920, given above, were greater than the figures for the ten months in 1921, since in this latter period the hours of flight totalled 532 2/3 and the number of passengers carried was 1878. There was no flying during the month of December, 1920, and January and December, 1921, due to unfavorable atmospheric conditions.

The above company is in operation at the airdromes of Arcore, Erba Incino, Taliedo and Centocelle, and at its seaplane stations at San Remo, Pallanza and Schiranna.

* * *

England—In order to speed up the delivery of goods to Paris from Manchester or other provincial towns in England, a night airplane service will shortly be inaugurated whereby parcels dispatched by passenger train after business hours from these towns will be collected by a special motor van from the London railway terminal between midnight and 1:00 a. m., and immediately thereafter put on board the night express leaving the London airdrome at 2:30 a. m., and scheduled to arrive at Paris at about 5.00 a. m. Upon arrival in Paris the goods will, by special arrangement, be passed through the French customs and delivered by motor van in Paris as soon as business houses are open. A similar arrangement is to be instituted in connection with goods from provincial towns in France consigned to London, an air express leaving Paris early in the morning and parcels sent from, say, Lyons or Lille, after business hours one evening will be delivered in London the following morning, or in Manchester or other towns by the afternoon.

The night expresses which are now being built will be equipped with instruments and navigation lights for night flying and this, in conjunction with the illumination of the London to Paris Airway, soon to be completed, will make night flying a safe and regular operation.

* * *

Denmark—According to *Flight* (London) arrangements have been made for inaugurating an air mail service between Rotterdam and Copenhagen. The company which is to undertake the new service is stated to be Danish, although it is intended to use British machines and pilots. The plan is to have machines leaving Rotterdam in the morning, after the arrival of the night boat from London, and it is expected that they will be able to reach Copenhagen shortly after noon, so that the mails should be distributed early in the afternoon in that city. In the opposite direction machines will leave Copenhagen at 3.00 p. m., and will reach Rotterdam in time to connect with the night boat to London. Thus, instead of taking 72 hr., the mails between London and Copenhagen should do the journey in about 24 hr.

* * *

The Netherlands—The Royal Aerial Navigation Co. (K.L.M. airline) of the Netherlands carried during 1921 a total of 1548 metric tons of mail, 36,634 metric tons of freight and 1674 passengers. The Amsterdam-London line accounted for more than half of the mail and merchandise, carrying 844 tons of the former and 24,875 tons of the latter. In 1921, 931 passengers traveled on the Amsterdam-Brussels-Paris line and 254 on the Rotterdam-Hamburg line. These figures indicate a marked increase over the 1920 volume of traffic, which totalled only 3 tons of mail, 22 tons of freight and 345 passengers.

ARMY AND NAVY AIR NEWS

Air Service

Chief of Air Service on Inspection Trip—Maj. Gen. Mason M. Patrick, Chief of Air Service, Capt. Wm. Ocker, Maj. H. A. Dargue and Maj. H. M. Hickam returned to Washington on May 8 by airplanes after a four day visit to New York and the landing fields and aircraft plants in that vicinity. Captain Ocker piloted General Patrick, and Major Hickam piloted the other plane.

During the sojourn in New York, these officers attended aerial maneuvers at Mitchel Field, and inspected several aircraft plants where Army work is in progress.

* * *

Army Teams for National Balloon Race—Army Balloon Pilots at the several fields are going through tests and preliminary races so that three teams can be selected to represent the Air Service in the National Balloon Race at Milwaukee on May 31. Reports of the races at the following fields have been sent into Headquarters at Washington for the selection of the race pilots: Langley, Ross, Scott, Brooks, Eustis and Aberdeen. The successful teams will be announced within a few days.

* * *

Disposal of Surplus Equipment—The Air Service to date of April 20, last, has disposed of 2439 airplanes, and 9090 engines besides spare parts and miscellaneous equipment for $2,337,567.60, the estimated war-time cost being $29,441,138.83. By disposing of this equipment the Air Service has realized approximately 8 per cent. It is said that, as the planes and engines are surplus, averaging about two years in age, the flying branch of the Army has done well to clean house of so much of its surplus material found useless for the service.

Since April 1, 184 engines and four Avros were sold, the balance having been sold before that date.

Following is a list of all surplus airplanes and aeronautical engines sold by the Air Service:

Airplanes

Avro 504K	4
Aeromarine MI	3
Breguet	15
Curtiss JN4A	57
Curtiss JN4B	14
Curtiss JN4C	347
Curtiss JN4D	216
Curtiss JN6H	4
Curtiss R4L	10
DH4	193
Fokker	12
Martin Bomber	6
Heinrich Scout	1
L.W.F.	85
L.V.G.	3
Nieuport	22
Rumpler C4	10
Standard D (seaplane)	1
Standard H3	8
Standard J1	1386
Standard JR1B	3
Standard S4	4
Sopwith 1A2	27
Spad	2
Thomas Scout	6
Total	2439

Engines

Anzani 50 hp.	5
Anzani 90 hp.	18
Austro-Daimler	1
Beardmore	32
B.M.W.	3
Bentley Rotary	5
Bugatti	11
Clerget 130 hp.	17
Curtiss VX	7
Curtiss V2	1
Curtiss V2-3	9
Curtiss V2C3	1
Curtiss V2C10	6
Curtiss OX5	4634
Curtiss S	1
De Dion-Bouton	2
Duesenberg	2
Fiat	379
Gnome 90 hp.	11
Gnome 120 hp.	12
Gnome 165 hp	20
Gnome 132 hp.	5
Hall-Scott A5	28
Hall-Scott A5A	38
Hall-Scott A7A	2114
Hall-Scott A7	1
Hall-Scott Liberty 6	1
Hispano-Suiza A	322
Hispano-Suiza E	25
Hispano-Suiza I	36
Hispano-Suiza H	122
Hispano-Suiza 220 hp.	8
Isotta-Fraschini	5
Lawrance A3	155
Le Rhone 80 hp.	254
Le Rhone 120 hp.	44
Le Rhone 300 hp.	2
Liberty 12A	312
Liberty N	55
Liberty 8-cyl.	11
Liberty Experimental	13
Lorraine-Dietrich	1
Maybach	6
Mercedes	107
Oberursel Rotary	1
Opel	6
Peugeot	9
Renault	98
Sturtevant 5A	113
Thomas	19
Wright 8	1
Wright D6	1
Total	9090

* * *

New A. S. Flying Field—A new flying field has been established near Venice, Calif., two miles from the Pacific ocean and turned over permanently to the Air Service through the efforts of Catron & Fisk, airplane manufacturers, and the Santa Monica Bay Chamber of Commerce. It is within easy reach of Los Angeles and is but a few miles west of the Rogers airport. The field is on high, level ground and its location is quickly found by any aviator crossing the mountains into Southern California from the north.

Mitchel Field—Brig. Gen. William Mitchell, Assistant Chief of Air Service, accompanied by First Lieut. L. J. Maitland, A. S., arrived at Mitchel Field by air from Bolling Field on April 21. The General spent several days at Mitchel Field and vicinity inspecting the sites of several aircraft corporations. He flew to all outlying stations, among them the plant of the Thomas-Morse Aircraft Corp., Ithaca, N. Y., and the Witteman Aircraft Corp. at Hasbrouck Heights, N. J. General Mitchell remained over for the Aviators' Ball on the evening of Monday, April 24, and returned to Bolling Field on the following afternoon.

Captain Mulcahey, U.S.M.C., has arrived at Mitchel Field and relieved Lieutenant Fleer as test pilot for the MB7. Immediately upon his arrival and almost daily since, Captain Mulcahey has flown this little plane. For the past few days he has been taking it over the measured course in an effort to determine its maximum speed. The course over which this plane has been flown lies over a portion of two neighboring villages, Garden City and Westbury. Captain Mulcahey has flown the plane rather low in order that he might stay directly over his pylons and not stray from the course.

The 24th Squadron (Pursuit) consisting of three officers (Capts. William E. Farthing and Norbert Carolin and Lieut. Arthur K. Ladd) and 125 enlisted men, and the 25th Squadron (Bombardment) consisting of three officers (Maj. Norman J. Boots and Lieuts. Cornelius J. Kenney and Edward E. Hildreth) and 126 enlisted men, departed from Mitchel Field for service in Panama on the morning of April 22, and sailed from the Army Base on the U. S. Army Transport Somme in the the afternoon of the same day. The departure of these squadrons reduces the garrison of Mitchel Field by about one-third.

Lieut. Eugene H. Barksdale, A.S., returned to Mitchel Field on the afternoon of April 22, flying the Curtiss Eagle. He spent three or four days ferrying this plane from Langley Field to its destination, due to bad weather and motor trouble which necessitated several forced landings, all of which, however, were made without accident. The Eagle came through in good shape.

* * *

Army Orders—Maj. Raymond Sidney Bamberger, A.S., has been transferred to the Adjutant General's Department, with rank from July 1, 1920.

Capt. Frank S. Mansfield, A. S. (Inf.), relieved from duty at Carlstrom Field, Arcadia, Fla., and from further detail in the Air Service, has been assigned to the 9th Infantry, Camp Travis, Tex.

Maj. Guy V. Rukke, Med. Corps, has been directed to report to Mitchel Field, L. I., N. Y., for duty.

Capt. John C. Christophel, Q. C., has been directed to report at Mitchel Field, L. I., N. Y., for duty as quartermaster.

First Lieut. Eugene L. Vidal, A. S., relieved from duty at Post Field, Fort Sill, Okla., is directed to report at U. S. Military Academy, West Point, N. Y., for duty.

Maj. Joseph C. Morrow, 13th Inf., detailed in the Air Service, is to report to Carlstrom Field, Arcadia, Fla., for duty.

Capt. Ralph H. Wooten, A.S., relieved from duty in the Hawaiian Dept., is assigned to duty at Langley Field, Hampton, Va.

Capt. Edwin J. House, A.S., relieved from duty at Langley Field, is assigned to duty in the Hawaiian Dept.

First. Lieut. Arthur G. Watson, A. S., now on temporary duty and training status at Post Field, Fort Sill, Okla., is relieved from further duty at Carlstrom Field, Arcadia, Fla., and will proceed to Pope Field. Fayetteville, N. C., and report in person to the commanding officer for duty.

* * *

Survey of New Model Airway—Under instructions recently received from the Chief of Air Service, First Lieut. Clarence E. Crumrine, A. S., has been detailed on duty to investigate the route of the Model Airway from Mitchel Field, L. I., New York, to Pine Valley Field, N. J. This work includes the making of standard sketches and the completion of questionnaires on all intermediate fields, together with the taking of oblique photographs.

The fields and following points are being investigated, sketched and photographed: Valley Stream, L. I., Belmont Park, L. I., Sheepshead Bay, New Dorp, Staten Island, Sandy Hook, N. J., Freehold, N. J., Prospertown, N. J., Camp Dix, N. J., Medford, N. J.

Work on the development of this air route has already begun. It has been delayed due to inclement weather but will be now pushed to rapid completion.

* * *

Kelly Field—Reserve officers from all branches of the service visited Kelly Field on April 7 in charge of Maj. Thomas Duncan and Lieut. W. A. Morris. This party, about sixty in all, witnessed the formation of DH's and XBIA's. Major Reynolds, commanding officer of Kelly Field, guided the party down the line, describing each event that took place. Much interest was exhibited in the GAX and its possibilities. An exhibition flight in this plane was made by Captain Shea to demonstrate the psychological effect of a low, harassment plane on ground troops. All left with a feeling that such a plane would be rather disturbing.

* * *

Clark Field—In preparation for the arrival of the new Philippine Department Commander, Maj. Gen. W. M. Wright, who sailed from the States on the Transport Thomas, arrangements were made for an eleven-plane formation to escort the Thomas to her dock. Five planes were flown to Paranaque Beach, Manila, on the morning of March 3, the pilots of these planes being flown back to Clark Field in the afternoon by pilots from Camp Nichols. At 6:45 a. m., March 6, a five-plane formation took off from Clark Field and flew to Manila Bay, where they were joined by the formation from Paranaque Beach. They flew to meet the Thomas and escorted her to the pier.

* * *

Fairfield Air Intermediate Depot—Orders in effect at the Fairfield Air Intermediate Depot, Fairfield, Ohio, require that all pilots make at least one cross country flight each month for a distance of not less than 100 miles, and that during the course of these flights they will endeavor to locate a desirable landing field, preferably a "local landing field" near some important town. If the field in question is deemed of sufficient importance the pilot will fill out a questionnaire giving particulars concerning same. This is considered a good policy and, if adopted generally, should tend to improve present conditions with regard to shortage of landing fields.

* * *

103rd Division, A.S.—Progress in the organization of the 103rd Division, A.S., has been fairly rapid considering conditions. Other Army Service units will be organized later. They will come under the head of "Army Troops." Names and qualifications are now being considered and set aside for the 436th Pursuit Squadron, Pueblo, Colo.; 437th Pursuit Squadron, Deming, N. M.; 438th Pursuit Squadron, Santa Fe, N. M., and 439th Observation Squadron, Phoeinx, Ariz. No Corps Air Service troops or lighter-than-air units have been allocated in this divisional area.

A keen interest in Air Service activities exists among reserve officers. All that have been interviewed are anxious to get hold of the "old stick" again and make inquiries as to the possibilities of a fifteen-day training period. Some of them have shown enough interest to write their Congressmen in Washington urging them to make sufficient appropriation for the Reserve Training Camp and to sustain the four million dollar appropriation.

Capt. Charles A. Pursley, A.S., was assigned to duty with the 103rd Division, A.S. (8th Corps Area) with station at Colorado Springs, Colo. Two rooms in the Federal Building at Colorado Springs are set aside for the headquarters of this Division. Captain Pursley, in his endeavor to obtain a suitable flying field at Colorado Springs or in the immediate vicinity, has invited recommendations as to a site from the Chamber of Commerce, civic organizations and citizens of the community. He has already inaugurated a publicity campaign.

Naval Aviation

Officers Selected for Aviation Training—The following fifty naval officers have been selected for aviation training at the Naval Air Station, Pensacola, Fla.:

Lieut. (jg) H. D. Baggett, Ens. E. C. Bain, Lieut. (jg) A. P. Burleigh, Ens. Wm. H. Buracker, Ens. Geo. F. Burdick, Ens. Eugene F. Burkett, Lieut. D. M. Carpenter, Ens. C. A. Collins, Ens. Thos. S. Combs, Ens. Frank H. Conant, Ens. Marion E. Crist, Ens. Richard H. Cruzen, Ens. L. W. Curtin, Ens. J. P. Curtis, Ens. E. R. DeLong, Ens. J. A. Dillon, Ens. A. K. Doyle, Ens. J. E. Doyle, Ens. H. F. Fick, Ens. C. D. Glover, Ens. D. S. Gurney, Ens. A. O. Harrington, Ens. D. Harrison, Ens. N. B. Hopkins, Ens. Douglass P. Johnson, Ens. Russell Keith, Lieut. H. S. Kendall, Ens. Dixwell Ketcham, Lieut. (jg) Dixie Kiefer, Ens. Eugene W. Kiefer, Ens. S. L. LaHache, Ens. J. B. Lyon, Ens. F. W. McMahon, Ens. Lunsford Y. Mason, Ens. G. W. Mead, Lieut. (jg) J. C. Metzel, Ens. E. E. Pare, Ens. E. C. Peterson, Lieut. (jg) A. O. Rule, Ens. G. E. Rosenberry, Ens. G. A. Seitz, Lieut. Forrest P. Sherman, Lieut. Allen E. Smith, Ens. Clyde W. Smith, Ens. Wm. G. Tomlinson, Ens. H. J. Walker, Ens. O. A. Weller, Ens. Richard G. Wiestling, Lieut. R. Wyman, Ens. J. L. Wyatt.

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Hampton Roads Naval Air Station—April 27 witnessed the completion of the comparative tests between straight-drive and geared down Liberty engines on two F5L's at Hampton Naval Air Station. A preliminary report on the tests indicates that the boat with the geared Liberty's was able to take off a few seconds sooner, and gave slightly better results. No definite decisions have been reached as yet however, pending further trials, although it is believed in some circles that geared drive may be employed eventually.

The Langley detachment continued its practice flying and landing, making in the past week 162 precision landings and two practice runs on the dummy deck with a DH4B the lower wings of which were stripped of fabric so as to permit very fast taxiing without taking off the deck. Two DH4Bs were assembled for the Anacostia Air Station.

An MF boat equipped with an Elias-Amphibious gear was tested recently at the station, safe landing and take-offs being made on both land and water.

The naval airship C7 made eight flights during the week, totaling 12 hr. 27 min. in the air, for the instruction of lighter-than-air personnel.

The aircraft tender Wright which reached Hampton Roads last week after her cruise south with the fleet, will proceed to Philadelphia, where she will probably remain a month. Lieutenant Commander Capehart, of the Plans Section of the Bureau of Aeronautics, it is expected will soon be detailed as aid to Capt. A. W. Johnson, of the USS Wright.

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Pensacola Naval Air Station—Several naval free balloon tests and flights have been conducted at Pensacola in anticipation of the National Races at Milwaukee the latter part of the month. It is understood that the Navy will enter two balloons, one to be piloted by Lt. W. E. Reed, and the other by Lieutenant Commander Northfleet.

Lieut. Rico Botta, until recently on duty as engineering officer at the Pensacola Naval Air Station, has been ordered to the Bureau of Aeronautics, Washington. He will be relieved at Pensacola by Lieut. G. L. Compo.

The landing field at Pensacola is in the course of improvement and is having a clay top arranged.

* * *

Anacostia Naval Air Station—Lieut. Harold F. Selden, USN, of Washington, and Ens. Frank Miller, USN, of Indiana were killed on the afternoon of May 5 as a result of an aerial collision between two naval seaplanes over the Potomac River near Bellevue Experiment Station. The two officers, flying a PTC plane, were making a propeller test when they collided head on with an Elias plane carrying Lt. Comdr. C. Y. Johnstone, C. O., of the Anacostia Naval Air Station, and Chief Machinist C. W. Jacobs. It seems that the two machines passed so close one above the other that one of the pontoons of Commander Johnstone's plane ripped off a wing from the PTC in which Lieutenant Selden and Ensign Miller were flying. The PTC was so badly damaged that she got out of control and fell turning over several times until she hit the water and sank. The bodies of the two fliers were found in about 30 ft. of water. The Elias ship was less severely injured and Commander Johnstone was able to keep her under control for a mile or so and make a landing, but on doing so the machine turned over sideways as one of the pontoons had been torn off in the collision. Neither man of the Elias ship was injured.

Rear Admiral William A. Moffett, Chief of Naval Aviation, flew to the scene of the accident as soon as he heard of it and paid a high tribute to the dead fliers, saying that "aviation has its sacrifices in peace as well as in war, and the two officers who lost their lives were martyrs to the cause of aviation."

The flying boat Santa Maria of the Aeromarine Airways landed near Anacostia after carrying nine local newspaper men aloft, just before the accident.

* * *

Captain Wann in Washington—Captain Wann, R.A.F., formerly commander of the British R38 (ZR2) was in Washington last week and paid his respects to Admiral Moffett of the Navy Aeronautical Bureau.

* * *

Orders to Officers, B. of N.—Lt. Comdr. Marc. A. Mitscher, Air Squadrons Pacific Fleet, to command Naval Air Station Anacostia, D. C.

Lieut. Lyman C. Avery, Air Squadrons Pacific Fleet, to USS Maryland.

Lieut. Andrew Crinkley, Air Squadrons Pacific Fleet, to Naval Air Station Pensacola, Fla.

Lieut. Fred C. Dickey, Air Squadrons Pacific Fleet, to Naval Air Station Pensacola, Fla.

Lieut. Harold A. Elliott, Air Squadrons Pacific Fleet, to Naval Air Station Pensacola, Fla.

Lieut. Robert M. Farrar, Air Squadrons Pacific Fleet, to USS Maryland.

Lieut. Adolphus W. Gorton, Air Squadrons Pacific Fleet, to Naval Air Station Anacostia, D. C.

Lieut. Rutledge Irvine, Air Squadrons Pacific Fleet, to Naval Air Station Anacostia, D. C.

Coming Aeronautical Events

AMERICAN

May 30 — Fourth Annual Aircraft Exhibition, Logan Field, Baltimore, Md.

May 31 — National Balloon Race, Milwaukee.

June 15-17 — Flying Meet, Monmouth, Ill.

Sept. 4 (about) — Detroit Aerial Water Derby, Detroit. (Curtiss Marine Flying Trophy Competition.)

Sept. 15 (about) — Detroit Aerial Derby, Detroit. (Pulitzer Trophy Race.)

Sept. 30 — First Annual Interservice Championship Meet. (In preparation.)

FOREIGN

August — Coupe Jacques Schneider. (Seaplane speed race.) Naples, Italy.

Aug. 6 — Gordon Bennett Balloon Race, Geneva, Switzerland.

Aug. 6-20 — Soaring and Gliding Competition, Clermont-Ferrand, France.

Aug. 9-24 — Soaring and Gliding Competition, Gersfeld, Germany.

Sept. 22 — Coupe Henri Deutsch de la Meurthe. (Airplane speed race.) France.

American elimination trials, if required, to be held about Aug. 15, at Mitchel Field, L. I.

Baltimore Air Meet, May 30

Every year since the close of the War the Baltimore Flying Club has held an aviation meet or as it is now called, an Exhibition of Aircraft. Each year's meet so far has proven to be a bigger success than the last. In 1919 there were hardly a half dozen ships on the field; in 1920 there were twelve or fourteen and the meet lasted an entire week. This, however, did not prove satisfactory for in 1921 the Club went back to the single day meet and drew the largest crowd they had up to

Ray Page, president of the Lincoln-Standard Aircraft Corp.

that time, while the exhibiting ships numbered about twenty-five, including commercial planes, sport planes, Army planes and National Guard planes.

A departure is to be made this year in having an event for water ships, that is, seaplanes and flying boats. This is easily possible for Logan Field, as the Club's beautiful and well kept airdrome is within a few hundred yards of the Patapsco River, a wide and well protected landing harbor.

The principal event, however, will be for land planes and the contests will be divided into four classes: (1) for commercial planes designated as ships carrying useful load of 750 lb. or more; (2) for sport planes which includes all one, two and three seaters; (3) for service pilots, Army pilots, Navy pilots and Marine Corps pilots and (4) for National Guard pilots. For the first time prizes will be awarded, but they will not be for speed or high altitude but rather for efficient design and precision flying. This does not mean there will be no speed races, for there will be several, but rather that speed will be secondary to speed range.

It is expected that practically all the entrants at the New York Spring Flying Meet will participate in the Baltimore event, and a number of additional commercial entries will be received from the middle west.

Mechanics' Summer Course

American Airways, Inc., of College Point, Long Island, announce a summer course for air mechanics beginning June 1, at a special low rate. This company has an excellent staff of instructors and gives thorough courses in engine assembly, mechanics and overhaul; rigging, wing construction and covering; theory of flight, ignition and elementary radio.

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